REMARKS

This amendment is being filed in response to the Office Action having a mailing date of July 12, 2007. Various claims are amended as shown. New claims 28-34 are added. No new matter has been added. Claims 16 and 23-27 are canceled herein without prejudice. With this amendment, claims 1-15, 17-22, and 28-34 are pending in the application.

I. Preliminary matters

The specification is amended as shown to make a typographical correction, so that the written description is consistent with the figures.

A supplemental Information Disclosure Statement (IDS), a copy of the non-published patent reference listed therein, and the appropriate fee are being submitted along with this amendment. It is kindly requested that an initialed copy of this supplemental IDS be returned with the next communication, so as to confirm that the references listed therein have been entered and considered.

II. Discussion of the amended claims and cited references

The Office Action rejected claims 1-12 and 16-27 under 35 U.S.C. § 103(a) as being unpatentable over Kenny (U.S. Patent Application Publication No. 2004/0036595) in view of Schuermann (EP Application Publication No. 0689161). Claims 13-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kenny in view of Schuermann and further in view of Turner (EP Application Publication No. 0899677). For the reasons set forth below, these rejections are respectfully traversed.

A. Discussion of amended independent claim 1

Independent claim 1 as presently amended recites, *inter alia*, "wherein the time interval t_j ends prematurely if none of said at least one tag responds, and the power P_{j+1} for the time interval t_{j+1} is subsequently sent." Support for this amendment can be found for example in paragraph [0023], Figure 3 and the accompanying description, and elsewhere throughout the present application. For instance in the disclosed embodiments, a frequency hop is forced from the first frequency to the second frequency, before completion of the time interval, if no tags

respond to the base station. Thus, there is no need to wait for the full time interval t_j to complete its duration (in which the first power is sent during the entire time interval) if no tags are responding. It is respectfully submitted that the limitations in amended claim 1 are not met by any of the cited references, whether singly or in combination.

For example, the present Office Action has admitted on page 5 that Kenny is silent with regards to time duration. Indeed, Kenny discloses sending a short-range low frequency signal (LF) to tags in a zone 1, and sending a longer-range high frequency (HF) signal to tags outside of zone 1. *See, e.g.*, paragraphs [0036] – [0037] of Kenny. However, he mentions absolutely nothing about prematurely ending a time interval if no tags respond, or the other associated limitations in amended claim 1 pertaining to time. Thus, claim 1 is allowable over Kenny.

In originally rejecting claim 1, the present Office Action has cited Schuermann as supplying the missing teachings of Kenny. However, it is respectfully submitted that Schuermann does not cure the deficiencies of Kenny.

For example, Figure 9 of Schuermann shows the durations of three power pulses as respectively being 50 milliseconds, 20 milliseconds, and 10 milliseconds. As explained in column 7, lines 18-25 of Schuermann, the purpose of providing these three power pulses with different duration is to provide different read ranges.

Some items can be ascertained from this disclosure in Schuermann. For instance, none of the power pulses at 50, 20, and 10 milliseconds are being ended prematurely if no tags respond. That is, these power pulses are continuously sent up to their respective full durations of 50, 20, and 10 milliseconds, as originally set by the user so as to sufficiently cover different read ranges. For example, Schuermann states in column 7, lines 18-19 that the 50 millisecond duration for the first power pulse provides a read range of 0.5 meters. Schuermann is completely silent regarding ending the first pulse (50 milliseconds) prematurely, for example at 35 milliseconds, if no tags have responded. Indeed, if Schuermann were to end the first pulse prematurely, the 0.5 meter read range, which was intended for his 50 millisecond power pulse, would not be sufficiently/fully covered by the prematurely ended power pulse.

Accordingly, Schuermann does not meet at least the limitations of claim 1 that require "the time interval t_j ending prematurely if none of said at least one tag responds."

Furthermore, it is apparent from Figure 9 and the accompanying description of Schuermann that he does not provide the condition for prematurely ending the time interval as set forth in claim 1. That is, claim 1 requires that the time interval be ended prematurely if none of the tags respond. In contrast, the only condition that Schuermann provides for ending the time interval of each power pulse is that it has to complete their 50, 20, and 10 millisecond durations, regardless of the number of tags that respond. Thus, even if no tags are responding to any of the particular power pulses, Schuermann appears to continue to send each power pulse anyways, until the respective durations of the power pulses are completed. There is no premature ending to the durations of his power pulses.

In view of the above, it is therefore respectfully submitted that claim 1 is allowable over cited references, whether singly or in combination.

B. Discussion of the other amended independent claims

Independent claim 12 is amended to recite, *inter alia*, "prematurely ending the first time interval in which the first power is sent and subsequently sending a second power at a second frequency to the plurality of tags if a time between received responses exceeds a response time sufficient to enable at least one of the plurality of tags to respond." As explained above, Kenny is completely silent with regards to time for sending power.

Further, Schuermann does not disclose, teach, or suggest any premature ending before a time limit is reached, and instead sends his power pulses for their full duration as shown in his Figure 9. His power pulses have specifically defined durations, so as to cover specific long, medium, and short reading ranges that Schuermann sequentially reads. These read ranges would not be fully covered if the time intervals for sending the power pulses are ended prematrurely.

Hence, claim 12 is allowable over the cited references.

Independent claim 18 is amended to recite, *inter alia*, that the base station is operable to "prematurely end the first time interval in which the first power is sent and subsequently send a second power at a second frequency to the plurality of tags if a time between received responses exceeds a response time sufficient to enable at least one of the plurality of tags to respond."

Independent claim 19 is amended to recite, *inter alia*, a base station operable to "prematurely end the first time interval in which the first power is sent and subsequently send a second power at a second frequency to the plurality of tags if a time between received responses exceeds a response time sufficient to enable at least one of the plurality of tags to respond."

Independent claim 21 is amended to recite, *inter alia*, "prematurely ending the first time interval in which the first power is sent and subsequently sending a second power at a second frequency to the plurality of tags if a time between received responses exceeds a response time sufficient to enable at least one of the plurality of tags to respond."

None of the cited references, whether singly or in combination, meet these limitations. Hence, claims 12, 18-19, and 21 are allowable.

C. Other claim discussion

Various other amendments are made to the claims as shown to make their language consistent with the recitations discussed above. Further, claims 1, 12, 18-19, and 21 are amended as shown to remove extraneous language. Dependent claims 16 and 23-27 are canceled herein without prejudice, since their recitations are now reflected in their respective base independent claims

III. Discussion of new independent claim 33

New independent claim 33 is presented herein and recites, *inter alia*, "reducing power P_j to a level $P_{j+1}, P_j > P_{j+1,}$ for a rest of the first time interval t_j if a number of responded tags is more than some particular number." These recitations are consistent with the recitations in claim 5, for example. As an illustration, there may be a situation in which more tags respond to the power P_j than are capable of being processed by the base station. Therefore, the base station reduces the power being sent so that fewer tags are able to respond, and thus the base station is then able to more suitably process the lesser number of responding tags.

Page 5 of the present Office Action has admitted that Kenny does not disclose reducing power. To supply the missing teachings of Kenny, the present Office Action has cited Schuermann. However, it is respectfully submitted that Schuermann does not cure the deficiencies of Kenny.

For example and as explained above, Figure 9 and the accompanying written description of Schuermann disclose a technique wherein the durations of the power pulses are preset at 50, 20, and 10 milliseconds. As can be seen in his Figure 9, these power pulses do have progressively reduced levels.

However, the condition in which the power levels are reduced requires a different condition in Schuermann than as set forth in claim 33. That is, Schuermann sends the power pulse (having a 20 millisecond duration) at a lower level relative to the preceding 50 millisecond power pulse, after completion of the duration of the preceding 50 millisecond power pulse. Schuermann then sends the power pulse (having a 10 millisecond duration) at a lower level relative to the preceding 20 millisecond power pulse, after completion of the duration of the preceding 20 millisecond power pulse. In other words, the sending of (and reduction in the level of) the individual power pulses of Schuermann are conditioned not on the number of tags that responded to the previously sent power pulse, but rather based/conditioned on the completion of the duration of transmitting the preceding power pulse.

Hence, Schuermann does not meet the limitations of claim 33 that require "reducing power … if a number of responded tags is more than some particular number."

Furthermore, it is noted that Schuermann's individual power pulses at 50, 20, and 10 milliseconds each have constant amplitude/level during their respective time intervals. Nowhere does Schuermann disclose, teach, or suggest that the during the 50 millisecond duration of the first power pulse, for example, the level of that first power pulse is reduced from an initial level to a lower level. Indeed, Schuermann suggests that this reduction should not be done, for instance, since the duration (and power level) of that first pulse is chosen so as to adequately cover a particular long read range (such as 0.5 meters). If the power level is lowered during that first 50 milliseconds, then there is a chance that some tags (outside of the reduced read range) may not be read, which is not the intended purpose of Schuermann when sending the power pulse (at 50 millisecond duration) to perform long range reading. The other power pulses are subsequently sent to cover medium and short reading ranges, and also have constant levels during their respective durations, as depicted in Figure 9 of Schuermann, so as to adequately cover their intended read ranges.

In view of the above, Schuermann therefore does not meet the other limitations of claim 33 that recite "reducing power … for a rest of the first time interval," since he keeps his power pulses at the same level in all of his individual time intervals.

Hence, claim 33 is allowable over the cited references, whether singly or in combination.

IV. Discussion of "same frequency band" limitation

The present Office Action rejected claims 1-27 under 35 U.S.C. § 112, first paragraph for allegedly failing to comply with the written description requirement, stating that "The limitation of the first and second frequency are in a same frequency band … are not disclosed in the specification." Claims 1, 12, 18-19, and 21 are amended to remove the recitations at issue, thereby rendering the written description rejections moot.

New dependent claims 28-32 and 34 are added, which are respectively dependent upon claims 1, 12, 18-19, 21, and new independent claim 33. These new dependent claims 28-32 and 34 recite that the first and second frequencies are "in a same frequency band." It is respectfully submitted herein that these recitations comply with written description requirements.

Page 3 of the present Office Action has asserted that "The specification discloses changing the frequency sent to the tag (page 6 lines 26-28) and also teaches changing the frequency of 2.4 GHz every 300 or 400 milliseconds but does not disclosed changing the first frequency to a second frequency in a same frequency band." This interpretation of the specification by the Office Action as a basis for issuing the written description rejection is respectfully traversed herein.

For example, paragraph [0023] of the present application discloses changing the frequencies in as little as 10 or 20 milliseconds "at 2.4 GHz," in contrast to conventional techniques that change frequencies every 300 or 400 milliseconds. Paragraph [0013] identifies 2400-2483.5 MHz as one of the frequency bands that is regulated by the FCC. This 2400-2483.5 MHz frequency band corresponds to the 2.4 GHz band in which frequencies are changed every 10 or 20 milliseconds as discussed in paragraph [0023].

Furthermore, paragraph [0013] cites FCC regulations 47 CFR 15.247 and 15.249 that pertain to transmission at certain frequency bands. 47 CFR 15.247 is quoted in part below:

> Sec. 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
>
> (a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:
>
> (1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW…

As evident from the cited passage above, "frequency hopping" (such as for example in the 2.4 GHz band) requires that the hopping frequencies within a given band are separated by a minimum of 24 kHz. As explained in paragraph [0013] and [0025] of the present application, government regulations impose limits on the amount of power sent out at a given frequency, and so one purpose of frequency hopping (in which frequencies are changed within a frequency band) is to spread out the power over a broader bandwidth.

Clearly, the present application discloses embodiments wherein frequencies are changed. Further evident from the written description is that these frequencies are changed within the same frequency band, since one purpose of changing the frequencies is to comply with the government regulations (discussed in the specification) that impose restrictions on power transmission. Still further, the very title of the present application is "Frequency Hopping Method for RFID Tag," which additionally reinforces the written description of changing frequencies within a same frequency band.

Hence, it is respectfully submitted that claims 28-32 and 34 comply with written description requirements.

It is further respectfully submitted that claims 28-32 and 34 are allowable over the cited references.

For example and as explained above, Schuermann changes the duration of his power pulses, and does not change their frequency—he maintains the same frequency for his power pulses. Accordingly, Schuermann does not meet the limitations of claims 28-32 and 34 that require the frequencies to be "different frequencies in a same frequency band."

Page 2 of the present Office Action has alleged that the limitation of "the first and second frequencies are in the same frequency band" is met by the LF signal of Kenny. Specifically, the present Office Action has pointed to Kenny's disclosure that his LF signal is between 30 kHz and 15 MHz, and then interpreted Kenny as teaching "varying the range of the LF carrier signal by adjusting the power and frequency of the LF carrier signal used to identify objects in a particular zone." This interpretation of Kenny is respectfully traversed.

In particular, paragraph [0037] and elsewhere in Kenny make it clear that he first sends the LF signal (for short range reading of tags within a zone), and then sends the HF signal (for longer range reading of tags outside of the zone). While Kenny does state that his LF signal is in the range of between 30 kHz and 15 MHz, nowhere does he teach that his LF signal is varied between this frequency range during the process of reading the tags in a particular zone, which the Office Action has attempted to assert.

As evident in Kenny's paragraphs [0007] and [0021], he sets the particular frequency of the LF signal based on the size of zone coverage desired. In other words, he selects a desired zone size (such as desk drawer size, room size, building size, etc. as described in his paragraph [0007]), so that objects within and outside of the defined zones can be tracked. He states in his Abstract that "LF and HF communications can be utilized to track objects in zones 1 and 2." His paragraphs [0007] and [0021] clarify that the frequency of the LF signal is chosen to correspond to the size of zone 1, so that tags in zone 1 can be read by the LF signal. Then, tags outside of zone 1 can be read by switching to the HF signal, which has a longer range than the LF signal. In short, Kenny switches from the LF signal to the HF signal when reading these tags. Nowhere does he disclose, teach, or suggest switching between different LF signals to read tags within one zone—he instead maintains the constant LF signal when reading within one zone.

Accordingly, it is respectfully submitted that claims 28-32 and 34 are allowable.

V. Conclusion

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, the independent claims are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 622-4900.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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